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## Father absence and timing of menarche in adolescent girls from a UK cohort: The mediating role of maternal depression and major financial problems



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In a prospective birth cohort study of 5295 girls from the UK-based Avon Longitudinal Study of Parents and Children (ALSPAC), we examined the association between biological father absence in childhood and age at menarche whilst adjusting for antenatal indicators of socioeconomic disadvantage and maternal characteristics. We also examined whether exposure to maternal depression and financial problems during middle childhood mediate the association between father absence and age at menarche. There was stronger evidence for an association between father absence during the first 5 years of life and early timing of menarche compared with father absence between 5 and 10 years. There was evidence that maternal depression and major financial problems explained some of the association between early childhood father absence and age at menarche. Although father absence cannot be a direct target of prevention, family-based programs to address family processes influenced by maternal depression and socioeconomic disadvantage may be effective.

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### Introduction

The pubertal transition is a critical developmental period associated with profound biological and psychosocial changes. Early timing of puberty in girls has been linked to adverse psychosocial and health outcomes (Mendle et al., 2006) including depressive symptoms (Joinson, Heron, Araya, & Lewis, 2013), poor body image and eating disorders (Striegel-Moore et al., 2001), and substance abuse (Patton et al., 2004). Age at onset of menarche is often used as an indicator of pubertal timing because it is a salient milestone that defines the female pubertal transition and signals reproductive fertility (Posner, 2006). Timing of menarche is influenced not only by genetic factors, but also by a range of environmental factors including family stressors (Graberc, Brooksgunn, & Warren, 1995). Absence of the biological father is one such stressor that has been linked to earlier timing of menarche (Ellis, 2004), particularly if it occurred during the first 5 years of life (Surbey, 1990; Wierson, Long, & Forehand, 1993). Life-course adversity theories view father absence as one of a range of stressors (e.g., socioeconomic

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disadvantage, parental conflict, negative parenting) linked to earlier onset of sexual activity and reproduction (e.g., Belsky, Steinberg, & Draper, 1991), whilst paternal investment theory (Draper & Harpending, 1982, 1988) emphasises the critical role of father absence during early childhood as influencing female reproductive strategies. Ellis (2004) suggested that absence/presence of the biological father and general effects of psychosocial stressors are each uniquely involved in timing of pubertal development through different neurobiological mechanisms.

Previous research has provided valuable evidence with regard to the link between father absence and timing of menarche, however, there are limitations of these studies that need to be addressed in order to advance understanding. The majority are based on cross-sectional samples (Bogaert, 2008; Hoier, 2003; Jorm, Christensen, Rodgers, Jacomb, & Easteal, 2004; Romans, Martin, Gendall, & Herbison, 2003; Quinlan, 2003). Of the previous longitudinal studies, some used relatively small samples (Belsky et al., 2007; Ellis & Garber, 2000; Tither & Ellis, 2008; Wierson et al., 1993), and some relied on retrospective recall of both timing of menarche (Mendle et al., 2006; Moffitt, Caspi, Belsky, & Silva, 1992; Tither & Ellis, 2008) and age of child at which biological father departed (Graber et al., 1995; Mendle et al., 2006). Retrospective self-reports of age at menarche are open to recall bias, particularly in older samples where more time has elapsed since the onset of menarche. Some of the earlier studies did not differentiate between early (<5 years) and later departure of the biological father from the family (Bogaert, 2008; Campbell & Udry, 1995; Moffitt et al., 1992; Romans et al., 2003; Wierson et al., 1993). This could have masked important differential effects since there is evidence that early, compared with later father absence, is more strongly associated with subsequent pubertal timing (Ellis & Garber, 2000; Quinlan, 2003; Surbey, 1990).

Many previous studies did not adjust for a range of confounders that are associated with both earlier timing of menarche and father absence, including socioeconomic disadvantage (Ellis & Essex, 2007; Hulanicka, Gronkiewicz, & Koniarek, 2001; James-Todd, Tehranifar, Rich-Edwards, Titievsky, & Terry, 2010), maternal educational attainment (Tither & Ellis, 2008), maternal depression (Ellis & Garber, 2000), and maternal age at menarche (Wierson et al., 1993). Higher levels of maternal education have been reported to be associated with intactness of the biological family and daughters' later age at menarche (Bogaert, 2008; Tither & Ellis, 2008). Socioeconomic disadvantage and maternal depression have been linked with family breakdown (Meadows, McLanahan, & Brooks-Gunn, 2008; White & Rogers, 2000) and earlier menarche (Ellis & Essex, 2007; Ellis & Garber, 2000). There is also evidence to support a strong association between earlier age at menarche of mothers and their daughters (Campbell & Udry, 1995; Rowe, 2002). Mothers who experience earlier menarche not only have daughters who mature at an earlier age (Ge, Natsuaki, Neiderhiser & Reiss, 2007), they also tend to engage in earlier sexual activity and childbirth (Deardorff, Gonzales, & Christopher, 2005), and have relationships that are more likely to end in dissolution (Moffitt et al., 1992; Surbey, 1990).

Although the association between father absence and earlier age at menarche has been previously reported, mechanisms underlying this association have not been extensively investigated (James, Ellis, Schlomer, & Garber, 2012). It has been previously argued that the effects of father absence on age at menarche may be explained by psychosocial and contextual stressors arising as a result of father departure, such as socioeconomic disadvantage (e.g., decrease in family income, major financial problems; Ellis, Fayden-Ketchum, Dodge, Petit, & Bates, 1999) and maternal depression (Ellis & Garber, 2000; for conceptual representation of the hypothesised mechanisms see Fig. 1). In particular, numerous studies have found that absence of the biological father from the household is associated with financial problems and decrease in economic well-being, particularly among women (Everett & Volgy, 1991; Sigle-Rushton & McLanahan, 2004). Similarly, a substantial body of research has examined the association between indices of childhood socioeconomic status (e.g., financial hardship) and pubertal timing (Arim, Tramonte, Shapka, Susan Dahinten, & Douglas Williams, 2011; Jean et al., 2011), with recent epidemiologic evidence linking lower household income to earlier timing of menarche (Braithwaite et al., 2009). Family dissolution and single parenthood have also been linked to poor mental health and depression in mothers (Cairney, Boyle, Offord, & Racine, 2003; Wade & David, 2004), which have been found to predict earlier age at menarche in daughters (Ellis & Graber, 2000). Some of the effects of father absence on age at menarche may, therefore, be mediated through exposure to financial problems and maternal depression. To our knowledge, however, no study has examined possible mediating effects of these factors in the association between father absence and timing of menarche in a multiple mediation model.

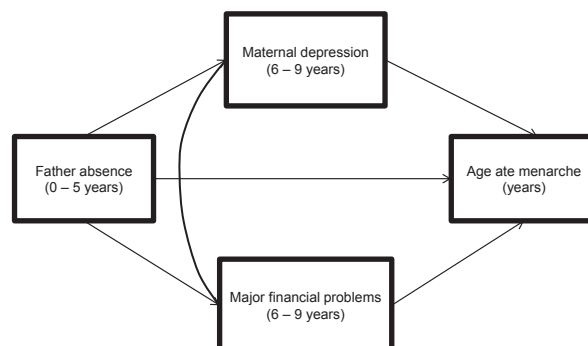


Fig. 1. Hypothesised model: pathways from early father absence to earlier age at menarche in daughters.

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